

**ABSTRACT**

The invention relates to methods of diagnosing membrane fluidity-related disorders, or predispositions to membrane fluidity-related disorders, in a subject such as a human patient or an animal, e.g., an animal model of a human disorder. In general, the method includes acquiring a first proton relaxation measurement for a selected region of the brain in a magnetic resonance imaging (MRI) procedure; administering to the subject a challenge that alters physical properties or chemical composition of cell membranes in the brain of the subject; acquiring a second proton relaxation measurement for the selected region of the brain in an MRI procedure; and detecting any difference, e.g., an increase or decrease, between the first proton relaxation measurement and the second proton relaxation measurement, wherein a difference indicates a membrane fluidity-related disorder. The invention also includes methods of assessing the effectiveness of treatments or drugs, e.g., drug candidates in an animal model, for such disorders.

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